

**DISCUSSION PAPER SERIES**

**Ford Foundation**

**DELHI**

**RAPID APPRAISAL FOR IMPROVING EXISTING  
CANAL IRRIGATION SYSTEMS**

**Robert Chambers**

D.P. No. 8  
Aug. 1983



The Discussion Paper Series of the Ford Foundation, Delhi, seek to make available to a wider public, information and analysis available within the Foundation and considered to be of interest and relevance to a larger audience. The series include selected papers and reports prepared by staff members or by consultants to the Foundation, and cover subjects in six major theme areas, which are the concern of the Foundation's work in India.

For further information Contact

The Ford Foundation  
55, Lodi Estate  
New Delhi

**RAPID APPRAISAL FOR IMPROVING EXISTING CANAL IRRIGATION  
SYSTEMS**

**Robert Chambers**

## RURAL POVERTY AND RESOURCES

### RAPID APPRAISAL FOR IMPROVING EXISTING CANAL IRRIGATION SYSTEMS

Robert Chambers

D. P. No. 8

August 1983

#### Abstract

This exploratory paper outlines some types of action to improve the performance of existing canal irrigation systems, and asks how to identify the best choice, mix and sequence of actions for a particular system. Current disciplinary orientations and appraisal practices are examined, and their tendency to overlook the full range of options. Proposals are presented for using techniques of rapid rural appraisal, and those who conduct appraisals are urged to write about and share their experiences.

## RAPID APPRAISAL FOR IMPROVING EXISTING CANAL IRRIGATION SYSTEMS<sup>1</sup>

1. This is a revised version of a paper entitled 'Appraising and Improving Canal Irrigation', written in April 1981. A number of knowledgeable people appraised that paper and with the benefit of their comments, and of publications and developments since that time, I have tried to improve it in this substantially revised and updated version. Those to whom I am grateful for constructive comments include Syed Hashim Ali, Daniel Benor, Anthony Bottrall, Ian Carruthers, Matt Dagg, G. Elumalai, G.N. Kathpalia, Roberto Lenton, Y.K. Murthy, Chris Perry, David Seckler, Leslie Sharan, K.K. Singh, Mark Svendsen, and M.N. Venkatesan. Errors of fact and judgement are my responsibility, and the views expressed are mine and not necessarily those of the Ford Foundation.

## Contents

The Objectives and Potential of Canal Irrigation	1
A Range of Actions	4
(i) action research	5
(ii) administrative practice and the law	5
(iii) administrative structure	6
(iv) biological problems and potentials	6
(v) farmers' organisations	6
(vi) farming systems	6
(vii) main system water distribution	7
(viii) main system works and maintenance	7
(ix) management science and monitoring	7
(x) physical problems and potentials	8
(xi) resource opportunities	8
(xii) works at and below the outlet	9
Choice Mix and Sequence	10
(i) professional predispositions	10
(ii) problems or opportunities	12
(iii) problem-solution reflexes	13
(iv) sequences, mixes and locations	15
(v) the uniqueness of each system	16
A Rapid Appraisal Approach	18
The Rationale for Rapid Appraisal	18
Experience with rapid appraisal of large irrigation schemes	19
Dangers of rapid appraisal	21
Team Composition	23
Logic and Sequence of Enquiry	24
Sources of Information and Insight	26
Activities and Sequence	27
(i) Selection	28
(ii) Preparation	28
(iii) The Rapid Appraisal	28
(iv) Follow-up	30
Improving Rapid Appraisals	31
References	



This paper seeks to open up questions about the appraisal of existing canal irrigation systems. It puts forward suggestions for the conduct of rapid appraisals in the hope of provoking comment, disagreement and more informed and tested recommendations. Although much of the evidence and perspective is Indian and South Asian, the intention is to encourage and support the development of methodologies for rapid appraisal which might be used in all countries with canal irrigation, and to provide a guide to some of the recent relevant literature on rapid rural appraisal (RRA). Hopefully this paper will be quickly overtaken by methodologies evolved and tested by the International Irrigation Management Institute, one of the priorities of which is to develop diagnostic methodologies for improving irrigation systems (CGIAR 1982).

Three terms need definition. In this paper:

'appraisal' refers to 'finding out' in a general sense. It is not to be confused with the World Bank's technical meaning of the word to describe a stage in the project process.

'canal irrigation' refers to gravity canal systems typically over 500 ha., and typically administered through some centralised bureaucracy. Much of the discussion could, however, also apply to smaller systems.

'main system' includes reservoirs and river diversions, and canals, distributaries and minor channels down to outlets which are the usual point of handover from irrigation management staff to farmers' groups and farmers.

### The Objectives and Potential of Canal Irrigation

The overarching objective of irrigation, as of all development, is human well-being. This has to be stated because it embraces many aspects of life which irrigation can affect but which are not always explicitly recognised. Among these are quality of health and nutrition, and a better life for those who are disadvantaged including women and the landless. As a means towards this, in countries where there is rural poverty and population pressure, a major intermediate objective can be described as carrying capacity - the capability of an irrigation system to provide adequate and secure livelihoods to households. However, for the purposes of appraisal of existing canal irrigation projects, the four most immediate objectives and criteria for

performance and improvement will often be productivity (especially the productivity of water where it is scarce), equity (especially in the supply of adequate, timely and predictable water to tailenders), and environmental stability (sustaining productivity and equity by avoiding waterlogging, salinity, erosion, flooding etc.), and finally for each of these, low cost.<sup>1</sup>

The potential for achieving these objectives on existing canal irrigation systems appears so vast that it is difficult to grasp. The benefits of well managed irrigation are well known. With physical and managerial upgrading, many irrigation systems could probably double production and serve equity much better. There is evidence of this from many quarters, but discussion here will be limited mainly to India. One approach to assessing the potential of canal irrigation in India has been explored by David Seckler. He uses a concept of 'capacity utilization', defined as 'the amount of effectively irrigated land which can be obtained from existing supplies of water at the headgates of irrigation systems, with good management of water through the farm level, and with economically justifiable improvements in physical distribution facilities' (1981:8). In Seckler's assessment, about one quarter of the major and medium irrigation systems in India (i.e. those with culturable command areas of 2,000 hectares and above) operated in 1981 at about 70 per cent of capacity utilisation: these were the warabandi systems of Northwest India (for which see Malhotra 1982). The remaining 75 per cent, he estimated operated/ab<sup>a</sup>out 25 per cent capacity. Taking the created potential as 30 million hectares (now roughly the 1983 figure), Seckler guessed that some 11 million hectares were effectively irrigated. This might be revised upwards somewhat, making a more generous allowance for irrigation in the major deltas to give a figure of perhaps 13-14 million hectares. But any such estimate is sensitive to the meaning attributed to 'effective'. Another approach is to think in terms of 'significant irrigation' defined as irrigation which markedly diminishes farmers' risks and is directly responsible for a quantum (say over 50 per cent) rise in the value of agricultural production compared with the condition without canal irrigation supplies. My guess would be that less than two-thirds of the area of potential created receives significant irrigation; and 'significant irrigation' itself is almost everywhere capable of considerable improvement through a more timely, reliable and appropriate supply of water.

---

1. For a fuller discussion of objectives and criteria, see Chambers 1982: 1-14.



There is much scattered evidence which lends general support to the orders of magnitude of these figures. There is a danger of being misled by the exceptionally unsuccessful project, for which Tawa in Madhya Pradesh may be a strong candidate, having even been cited for reducing production (e.g. Mishra 1981). Its design intensity was 125 to 138, and its reported intensity in 1980/81 and 1981/82 was only about 14 per cent. But if we examine other more representative projects, not specially selected for poor performance, inequity and low productivity are still evident. On the Upper Ganga system, in Western Uttar Pradesh, where a high level of management, similar to that of Haryana and Punjab, might have been expected, a study (Padhi and Suryavanshi 1982) has shown on one distributary near the middle of the system, (where main canal supplies should be adequate) an intensity of 119 at the head, but only 77 in the middle and 68 at the tail. These figures are, moreover, liable like so many others to sharply understate the inequity in water distribution, since there was a marked concentration of sugarcane at the top, and under current conventions, even when it is irrigated all round the year, land under irrigated sugarcane counts as an intensity of only 100. On the massive Sharda Sahayak system, further to the east in Uttar Pradesh, with over 1.4 million hectares of potential created in 1980/81 (Swaminathan 1981:25), it was reported in 1981 that 'farmers at the top end got five irrigations while farmers in the lower reaches hardly got one irrigation, resulting in extremely low yields' (Ali 1983:43). In a study of the Mahanadi Reservoir Project (irrigating 180,000 ha) in Orissa during kharif 1980 (WAPCOS 1981, cited in Lenton 1982), it was found with crop-cutting experiments that paddy yields followed steep gradients in yields from head to tail. These gradients were least steep with individual chaks, and then progressively steeper in the minors, distributaries, and canals. The average yield in outlets at the head of minors at the head of distributaries at the head of the canal was 1541 kg/ha, while at the other extreme - at the tail of minors at the tail of distributaries at the tail of the canal - it was only 218 kg/ha. Much other evidence is now documented for other states such as Andhra Pradesh (Ali 1980) and Bihar (Pant 1981) to support the hypothesis that the area effectively and significantly irrigated is much less than that declared as potential created or as potential utilized.

That improvements are possible through changes in management and through physical upgrading of systems, is increasingly supported by experience, with the sharp increase of production on part of the Pochampad Project in Andhra Pradesh (Hassan 1981) as an example. Besides production, equity is served when more water

is delivered more reliably to the tails of systems; and environmental stability is served to the extent that waterlogging and salinity can be reduced or averted through more sparing issues of water in head-reaches. In 1981, the then Secretary for Irrigation, Government of India, said that

'There is tremendous scope for increasing productivity of land and water from the available quantum of water, and this is why I think it a matter of primary importance that we reappraise the canal system at the existing level of technology'

(Patel 1983:10)

Following such reappraisals, there would be a different picture of water availability and demand, and modernisation could follow, leading to more efficient and equitable water distribution.

The need for reappraisals raises the issue of how they should be carried out, by whom, and over how long a period. There are many types of technical study which can be required and which may take considerable time. But there are prior questions, before such studies, of how priorities and the need for studies are identified in the first place. This leads back towards the methodologies of rapid rural appraisal and what alternative interventions are identified and considered at a reconnaissance stage.

Two questions to be explored are, then:

first, what is the range of actions which can improve canal irrigation performance?

second, how can an existing canal irrigation be appraised cost-effectively to identify an optimal mix and sequence of such actions?

### A Range of Actions

The range of actions which may improve canal irrigation performance is, on reflection, surprisingly wide. While this is far from a comprehensive list, twelve types, each presenting a point of entry or intervention, can be noted. In alphabetical order, these are:

- (i) action research
- (ii) administrative practice and the law
- (iii) administrative structure

- (iv) biological problems and potentials
- (v) farmers' organisations
- (vi) farming systems
- (vii) main system water distribution
- (viii) main system works and maintenance
- (ix) management science and monitoring
- (x) physical problems and potentials
- (xi) resource opportunities
- (xii) works at and below the outlet

(i) Let us examine briefly what each of these may entail:

action research. With this approach (Bottrall 1980; Lenton 1980; TNAU 1981) promising experimental measures are devised, introduced, monitored, and developed as part of a learning process and with a view to replication. Action research can entail any of the other interventions and is a method for testing and improving them. Typically, action research takes place in one part of a system although in principle it can be conducted with main system management of an entire canal network. It has been undertaken with subsystem canal management in two places in the Philippines (Valera and Wickham 1976; Early 1980); with field channel and on-farm development in Pakistan (Lowdermilk et al 1978; Reuss 1980); with rotational water supply in Pochampad in Andhra Pradesh (Ali 1980; Ali and Hassan 1980); with distributary management on the Mahanadi Delta in Orissa (personal communications, Tom Wickham); and with farmer participation on the Gal Oya Project in Sri Lanka (Wickramasinghe and van der Velde 1981), to mention but some. Action research merges into pilot projects, but may be distinguished by a high level of monitoring, the aim of replicability, and research and monitoring activities.

(ii) administrative practice and the law. Here the point of entry is a change in administrative practice, or in the law, or in both. The change may be seen as a precondition for other changes, and as a catalyst for them. Examples are abolishing water rates which act as a disincentive for efficient water use, and so arranging them that there is an incentive for lightly irrigated crops (Kathpalia 1980:41); changing law and practices which require irrigators to indent for water, where this prevents irrigation reform as may be the case with farmers having to indent for water as in Gujarat; and tightening discipline against water poachers through changing the law to permit summary trials of offenders, together with an administrative change to introduce touring magistrates to permit quick hearings during the peak poaching periods.

(iii) administrative structure. The action here is the creation of a new organisation or new organisational structure, perhaps to achieve better coordination. The intention can be that a new authority will be able to bring different departments closer together, and require better performance of them. Or a new structure may be required for a new function. Examples have been the creation of the Mahaweli Development Authority in Sri Lanka, and of the Command Area Development Authorities in India.

(iv) biological problems and potentials. The starting point here is with plants. It may be a problem - a pest and disease build-up, unsatisfactory water supply and untimely cultivation; or it may be a new potential through the introduction of a new crop or a new variety, for example with a growing period which better fits the irrigation water supply.

(v) farmers' organisations. The action here is to encourage and support the formation of farmers' groups. The starting point is seen as the community and those who have land below a particular outlet. Farmers' groups may be able to manage the allocation of water among themselves, and also secure their water supplies from the canal system, asserting their rights as against other groups and making effective demands on the bureaucracy.

(vi) farming systems. The argument for starting here is that the farm family is the production unit and the main beneficiary from irrigation, and therefore the logical place to begin. Analysis of the farming system, and its constraints, including cropping patterns, labour profiles, costs, risks, inputs, cultivation practices, yields, storage, marketing, income, and so on - leads to the identification of feasible improvements and their irrigation requirements. Changes in farming practices (from single-cropping to double-cropping, or changing the crop mix, or intercropping, or adopting shorter or longer-duration varieties, etc.) may then be tested on research stations, demonstration plots, and with farmers. Irrigation management is then modified to supply the water required, phased in with the adoption of the new practices.

Examples include the growing of a second season crop, where a crop was only grown in one season before (as with a gram which uses residual moisture and only one or two short waterings), or a shift from one paddy crop to two other crops.

(vii) main system water distribution. The point of entry here is the distribution of water on the main system. The argument is that an adequate and reliable supply of water to outlets is a precondition, often not met, for many other improvements in performance. The start has, therefore, to be made by examining the distribution of water and then by making changes, especially through timing, rotations, and communications and control, to provide more appropriate and reliable water supplies to outlets. This can usually be done, even if not ideally, without new or renovated structures, even though those may be desirable in the longer term. A downstream control system (Kathpalia 1980:40) may be needed, with information about water requirements passed upwards to the controlling authorities. Priority for main system management has been argued in several places, and accumulating evidence suggests the benefits can be high (Valera and Wickham 1976; Levine and Wickham 1977:3-4; Early 1980; Wade and Chambers 1980). Those who advocate starting with main system distribution argue that on some, perhaps many, systems such changes could be introduced without delay with high benefits in both production and equity, and negligible additional costs. One straightforward measure for the main system, adopted by the Government of Andhra Pradesh for kharif 1980, has been to issue a Government Order requiring that rotational irrigation be practised (GOAP 1980).

(viii) main system works and maintenance. The case here is that major works and/or maintenance are essential to maximise the supply of water, minimise losses, and maintain the supply and delivery system in good condition.

Until this is assured, other efforts towards improvement will be ineffective or short-lived. Major works may be needed to increase the total water available (through new dams, storage or diversions), for balancing purposes, for canal regulation, for canal lining, and for drainage. Once these measures are completed, and good maintenance is assured, other measures can then follow. There are many examples of major works undertaken after canal systems have begun to operate, and of the need for better maintenance. Canal lining is one common programme under this heading.

(ix) management science and monitoring. In this analysis the point of entry is seen as the management system. (The word "management" can lead to confusion. Three senses can be distinguished: the management of natural resources such as water, meaning how they are controlled and used; the management of



people, both within bureaucracies and members of the public; and the management of information and controls, usually with a cybernetic idiom, which is the primary sense in which David Seckler (1981) uses it. These three meanings often overlap in common usage, and lead to misunderstandings between people with different disciplinary and professional backgrounds). In Seckler's view, "the major reasons for the poor performance of public sector systems is the lack of feedback regarding system performance, the outputs". He argues that canal irrigation in India is "administered", with feedback on inputs, rather than "managed", with attention to outputs such as capacity utilization. The implication of this diagnosis could be that the first intervention should be to introduce monitoring of outputs (area irrigated, yields, etc.), and their use in management. Once information of this sort was being fed back to managers, then management by objectives, and more effective management can follow.

(x) physical problems and potentials. The start here is with a physical problem such as waterlogging and salinity, or black soils irrigation in kharif. Finding and testing a solution to the problem is the first stage, to be followed by establishing the conditions, such as a fine-pointed water supply from the main system, conjunctive use of groundwater in the dry season, change in cropping pattern, farmer organisation, or the construction of drains for achieving the solution.

(xi) resource opportunities. The starting point here is with lateral thinking. Opportunities are sought not in the central elements of the irrigation system but on its fringes. Slack, or potentially slack, resources are sought. To varying degrees there are implications, however, for how the irrigation system is managed.

Examples include:

- the conjunctive use of ground and surface water
- fish farming in tanks or canals
- the use of silt to improve light and porous soils and to help groundwater recharge, while at the same time desilting canals and tanks
- the cultivation of tank beds as the water draws down
- the elimination of small tanks on larger systems, and the conversion of their beds to irrigation



- fertiliser farming on tanks, for example with blue-green algae
- growing trees or fodder bushes on banks and bunds
- the conversion of swampy areas to fish or frog farming, or growing reeds for basket work etc.

The argument is that other changes are difficult or would take time, whereas these might generate earlier and easier benefits and establish preconditions (a complementary water source, another source of income and food, relief of population pressure through settlement on tank beds, etc.) for other developments.

(xii) works at and below the outlet. Development works at and below the outlet are often seen as a point of entry, and often as a precondition for other improvements. Unless field channels can convey water from the outlet towards the fields, on-farm water control will be difficult. Unless fields are so shaped as to permit even water applications, irrigation efficiencies will be low and yields will suffer. In particular, lack of field channels, and the field to field irrigation which goes with it, lock farmers into water tolerant crops, notably paddy, whereas controls and field channels enable farmers to regulate the amount and timing of water their fields receive, so that they can grow more water-sparing crops. The Command Area Development Authorities in India are committed to this twelfth approach.

In writing this, I have been surprised at how long this list is, reflecting the many dimensions and complexity of managed or administered canal irrigation systems. But even so the reader may have noted the cursory and incomplete nature of the list. No mention has been made of agricultural extension, agricultural marketing and prices, credit, improving the lot of women and other disadvantaged groups, land consolidation, land reform, or the supply of inputs such as fertiliser, pesticides and seeds. But the list is long enough to make the point: that in improving canal irrigation performance there are many alternative interventions. There is a wide choice of what to do and where to start. Any one of the twelve actions could be the point of entry, undertaken independently, and benefits might follow from it. All, however, would benefit from one or more of the others. They are thus synergistic: in the right combinations they generate benefits which are greater than the sum of their individual benefits. And some are necessary preconditions for deriving substantial benefits from others.

One implication is that any appraisal must be aware of the whole irrigation system. This has two senses. The first is that these many dimensions must at least be on a checklist. The second is that the whole physical entity of an irrigation system should be the frame of reference and not just one geographical part of it.

In clarifying one's own view of priorities, it is useful to rank the twelve measures. Two sheets are provided for this purpose at the end of the paper. The reader who is introspective and reflective about his or her own attitudes and views, may wish to detach one sheet and fill it in before continuing.

### Choice Mix and Sequence

This exercise serves to raise five questions which affect the mix and sequence of actions to be chosen.

(i) professional predispositions. What determines one's choice of priorities and sequences? Is it professional training, interests, and preferences? Is there, for example, something like the following pattern ?

<u>Type of measure preferred</u>	<u>Who by</u>
action research	researchers and research-funding organisations
administrative practice and law	administrators and lawyers
administrative structure	administrators
biological problems and potentials	agronomists
farmers' organisation	extensionists, sociologists
farming systems	agricultural economists
main system water distribution	political economists
main system works and maintenance	irrigation engineers
management science and monitoring	management scientists

<u>Type of measure preferred</u>	<u>Who by</u>
physical problems and potentials	soils scientists, hydrologists, agricultural engineers
resource opportunities	geographers, and lateral thinkers of all disciplines
works at or below the outlet	agricultural engineers
(pricing water	economists) <sup>1</sup>

Now each discipline and profession has its own proper concerns and agenda. Visiting the same project at the same time, a systems engineer, an agricultural engineer, a soils scientist, a crop agronomist, an agricultural economist, and a sociologist, will all see and ask about different things and may neither see nor know to ask about others. A sociologist may know nothing about cross regulators; an engineer may not know about soil-plant-water relationships; an agronomist may not know about labour availability and relations; and a soils scientist may not know about market prices and crop profitability. To the extent that they are at least aware of these other dimensions they may be professionally more effective. But in general, they rely on other disciplines to examine the questions outside their own professional range, to identify problems and to propose solutions and ways forward.

The implication for appraisals is both obvious and startling. If any one of the twelve types of action may in reality be the best point of entry, and if the interventions identified and recommended by an appraisal team depend on the disciplines of its members, then the cost-effectiveness of those recommendations depends on the composition of the team. The recommendations of the Indian teams which visited 24 projects (CWC c. 1980) are clearly separated into those of the irrigation engineer concerning irrigation engineering,

---

1. The distressingly predictable reflex of conventional economists is to propose an intervention through pricing based on the volume of water supplied to individual farmers to induce them to use it sparingly and productively. Since canal irrigation systems in South Asia cannot combine volumetric measurement of water to individual farmers with a supply that responds to demand, this does not yet appear feasible as an incentive system on any scale.

those of the agronomist concerning agriculture, and those of the administrator concerning administrative and legal aspects. Had it been possible, as intended, to recruit more disciplines, a different spectrum of recommendations would have emerged. The practical conclusion is that if recommendations are to be close to optimal for any given system, then either the appraisal team should be carefully composed, or those taking part should take steps to fill in disciplinary gaps.

(ii) problems or opportunities. Problem-solving can be a most useful activity, but it is not necessarily the most cost-effective. Not all problems are worth solving. It may simply not be worth trying to get water to a distant tailend, or to get design discharges flowing in a main canal, or to reduce seepage losses by lining distributaries. It depends on costs, benefits and alternatives. The alternatives may often include some which involve not the solving of problems but the exploitation of opportunities. The two orientations may be characterised as:

	<u>problem-orientation</u>	<u>opportunity-orientation</u>
task	diagnosis of deficiency	identification of potential
evaluative style	'closed' evaluation against original design specifications	'open' evaluation against what might now be achieved
action recommended	ease a constraint	exploit a resource
target set	minimise loss, or restore to a previous or intended condition	develop a new level of performance

An opportunity orientation starts with resources. On an irrigation system this leads logically to examining the distribution of those resources, notably water. This in turn leads to main system management and distribution below the outlet. An opportunity-orientation can raise questions of:

- irrigating a larger area
- increasing intensities
- growing more profitable crops

- staggering cultivation to spread peak water demand
- seeking ways in which topenders can gain although receiving less water
- exploiting waterlogging (for growing trees, establishing fish farms, irrigating a summer crop with lift irrigation, etc.)
- water-saving responses to maximise use of rainfall
- use of groundwater replenished by canal seepage
- saving and using water wasted at night

There is a sense in which some problems are opportunities. But not all are. And not all opportunities begin as problems. It is not a question of either a problem-orientation or an opportunity-orientation, but of a balanced mix. The recurrent danger is that preoccupation with problems will prevent the recognition and exploitation of opportunities.

(iii) problem-solution reflexes. Problem and professional reflexes point to certain habitual prescriptions. Without seeking to be dogmatic, the following speculations raise questions which may provoke agreement or dissent.

<u>Professionals</u>	<u>Problem orientation indicates</u>	<u>Problem solution reflex</u>	<u>Opportunity-orientation indicates</u>
Administrators	"lack of coordination"	new organisational structure with the administrator coordinating	improve procedures and performance in existing organisations
Agricultural economists	agricultural prices and marketing	improve marketing and prices	evolve new more profitable cropping systems, smoothing labour demand
	labour constraints	raise wages	
	risk	reduce risk	

<u>Professionals</u>	<u>Problem orientation indicates</u>	<u>Problem solution reflex</u>	<u>Opportunity-orientation indicates</u>
Agricultural engineers	poor levelling lack of field channels	comprehensive development below outlet	more replicable low input solutions with farmer participation
Agricultural extensionist	farmers' ignorance of water management	communicate to and 'educate' farmers	enable farmers to organise to improve onfield deliveries of water
Agronomists	water supply is too much, too little, or untimely	supply exact plant requirements	adapt crops, varieties, rotations, and timings to the available water supply
Economists	waste of water  underutilisation of potential low returns on capital	water pricing  further investment	seek other ways to make water more productive
Engineers	inadequate physical works  inadequate maintenance  waterlogging	construct better works  more resources for maintenance  construct drains	change and adapt water distribution on the main system using existing structures  use groundwater for dry season irrigation. Grow trees or fish
Political scientists	inequitable distribution of water on the system	change power structure  represent tail-enders	seek ways to re-distribute water so that all gain
Sociologists/ social anthropologists	inequity and conflict over water below the outlet	conflict resolution in the community	evolution of equitable and productive distribution system below the outlet



This is not to imply that problem solution reflexes are wrong. But there is a tendency, profession by profession, to advocate and seek problem-correcting interventions. Quite often these turn out to be variously costly, difficult, slow to implement and/or unlikely to occur. They are also quite often dependent on external resources and on action, sacrifice or loss on the part of others. In contrast, most of the actions indicated by an opportunity orientation have some of the following characteristics: they are less costly, less difficult, quicker to implement, more likely to occur, and require less external resources.

One aspect of problem solution reflexes is the tendency to export its problems to other disciplines. The agronomist determines plant water requirements and then hands over his findings to the engineer, expecting him to deliver the exact amount of water at the right time. The agricultural engineer puts in field channels and hands over to the extensionist the problem of organisation for maintenance. Economists recommend water pricing and hand over to engineers the problem of how to measure water and to administrators the problem of how to collect the dues. Engineers construct the works and then pass over to the extensionists and sociologists the residual problem of participation by the people. For their part, extensionists and sociologists identify and organise community demands and requirements for water, and pass the problem of that demand over to the engineer. Political economists sit on the side lines and tell everyone else how they are failing and what they should do. Optimal action, in contrast, will often be closer to home, and involve professionals in doing what they can themselves do more immediately.

(iv) sequences, mixes and locations. Appraisals, especially rapid ones, tend to generate lists of actions required, without specifying their sequence, mix and location. One consequence can be the implementation of some measures without others which are complementary or necessary for their success (field channels without organisation for maintenance, cross regulators without managerial controls to use them, warabandi without a constant supply of water at the outlet and so on). The choice of location in which to start to implement changes also affects the chances of success.

Identifying optimal sequences is less easy than might appear at first sight. Some considerations are:

- a. some measures are strongly interdependent with others or pre-conditions for them. One of the prerequisites for identifying what best to start with and the best sequence, is an understanding of these interdependences.

b. some measures are quick-acting, others longer-term. There may be a case for a quick-acting intervention such as rotation of main system water distribution, while in parallel pursuing longer-term changes such as farming system analysis, or canal lining, or changing outlet structures.

c. the sequence of locations may be significant. It may be a nice decision whether to start by, say, trying to issue less water at the head, or by generating more effective demand for water from the tail, or both simultaneously. The sequence is likely to influence the nature and success or otherwise of the outcome, especially depending on the degree of perceived conflict of interest generated between different groups of irrigators.

d. optimal sequences may vary by location. Waterlogging may be a problem in the head reaches, while water shortage and unreliability may be a problem in the tail. The sequence in the head reaches may be farming systems analysis to identify profitable alternative and more water-sparing cropping patterns, combined with main system water distribution to reduce water issues, while in the tail reaches the sequence may be farmer organisation to secure and manage the water supply combined with works at or below the outlet. The administrative reflex of standard treatment may be especially inappropriate in improving canal irrigation. It may often be optimal to devise a sequence of mutually supporting changes which differ by location.

(v) the uniqueness of each system. One difficulty in completing the priorities chart in the appendix is the knowledge that 'Ultimately each canal system has developed a unique pattern of its own' (Patel 1980:7). Indeed, each combination of water supplies, and each branch canal, distributary, minor, subminor, field channel, field, farming system, village community, farmers' organisation, combination of soils, slopes, hydrological conditions, and so on, is also unique. The major differences between North Indian and South Indian canal irrigation are well-known at a high level of generality; but there are also major differences between systems even within the same State. Nor are these merely physical. Legal and administrative practice, irrigation bureaucracy and roles, conventions about water allocations, social organisation, and agricultural and economic conditions also differ. It is questionable whether any one formula can be universally applied.

Faced with the problems and potentials of many complex and varied systems, it is, however, tempting to simplify and generalise. The apparently straightforward solution is identified and then an attempt made to apply it across the board. To some

extent this is necessary; and programmes under the Command Area Development Authority programme in India for on-farm (i.e. below the outlet) development are a case where a widespread problem required and requires a widespread solution. But these may be more feasible with physical works, involving fewer variables, than with combinations of works and social organisation, where there are more variables, and more preconditions for the success of a particular measure.

A case in point is the programme for the introduction of warabandi (Singh 1980a; Malhotra 1982), on various systems throughout India. The target is to introduce warabandi on 0.75 million hectares in 1983-84 (Times of India, 21 June 1983). In its classical Northwest Indian form it is a method for minimising main system management complexities and allocating scarce water between farmers on the basis of strictly timed turns at the same time each week. It works because of the design of the canals and the structure of the outlets which, within reasonable tolerances, assure a constant supply when the canal **is flowing**, and because farmers accept rigid timings for the receipt of water. In my analysis, there are preconditions for the successful operation of this system:

- a scarcity of water (demand exceeding supply)
- the physical and managerial capability to ensure a constant flow, at predetermined times, through the outlet
- automatic outlets which it is difficult for staff or farmers to manipulate
- field channels which can supply the full flow to each farmer's fields adequately
- farmers believing the flow to be constant

Outside the Northwest it must be rare for all these conditions to be found together. But if any one of them is not present, the introduction of warabandi will be difficult. Because the social and organisational aspects have been emphasised, the physical preconditions have tended to be overlooked. Whatever happens where warabandi is introduced outside the Northwest, it is unlikely to operate like classical warabandi.

In the longer-term it may be more cost-effective to restrain broad programmes of this sort, and to substitute appraisals. These would examine each system and tailor subsequent actions to its

individual physical, biological and social conditions, drawing on a large repertoire of potential interventions. Each system could then develop and improve along its own lines. The most cost-effective measure of all initially might be a national programme to reappraise all existing canal systems to identify, case by case, the best mix and sequence of improvements.

### A Rapid Appraisal Approach

To the extent that it is true, as argued above, that:

- benefits from potential improvements are large
- the choice of interventions is wide
- appraisers tend to identify measures connected with their own disciplines and professions, and
- the optimal mix and sequence of action depends on the characteristics of each system and of its parts,

then the practical question follows:

how can appraisal of existing canal systems best be organised to identify optimal mixes and sequences of action to improve performance?

### The Rationale for Rapid Appraisal<sup>1</sup>

Faced with the wide range of choices for interventions, mixes and sequences, and the need to tailor them for each system and even for different parts of systems, one response is to call for large-scale, multi-disciplinary monitoring and research over a period of years. Only when much more is known about the complex problems and linkages, it may be thought, will it be possible to see what best to do.

This is unlikely to be a cost-effective approach. There are already too many instances of rural studies generating mounds of indigestible data which cannot be processed, or which even if processed are useless. There is, certainly, a case for identifying key items of information which should be collected continuously in order to improve future decisions. But meanwhile time is passing. Trade-offs are needed between amount, accuracy, relevance, timeliness and actual use of information. The concept of optimal ignorance

1. The rationale, techniques, uses and dangers of rapid rural appraisal (RRA) are discussed at greater length elsewhere. Published sources include *Agricultural Administration* (8,6) 1981 (Special Issue on RRA); Chambers 1980c; Honadle 1982; Longhurst, ed. 1981; Pacey 1981; and Rhoades 1982. For an insightful and directly relevant discussion of RRA of large irrigation schemes see Bottrall 1983.

applies here: the importance of knowing what it is not cost-effective to know and of realising degrees of accuracy which it is not cost-effective to achieve. The long-and-dirty (large amounts of precise information which are late and not used) contrasts with the quick-and-clean (smaller amounts of less accurate information available quickly and actually used).

In summary, the case for trying to devise and improve quick-and-clean approaches for the appraisal of existing canal irrigation systems rests on the following points:

- a. the huge potential for benefits, especially increased production, and improved equity. Delays therefore have very high costs in delaying future streams of benefits
- b. the possibility of realising some benefits quickly. This applies especially to main system water distribution.
- c. the way decisions are taken on the basis of rapid appraisals anyway, including decisions about what long-term data to collect. Moreover, the more senior people are, the more rapid their appraisals are likely to be, and the more decisions and changes are likely to flow from them; all the more important, therefore, are the means whereby they acquire their quick knowledge.
- d. irreversible commitments to lines of action tend to occur early in decision processes about irrigation projects (Carruthers 1979)
- e. the greater ease of mobilising teams of competent appraisers for a short period than recruiting them for more lengthy work
- f. comprehensiveness and flexibility. A rapid appraisal team can be organised to cover a range of concerns without an institutional commitment to certain solutions.

#### Experience with rapid appraisal of large irrigation schemes

Over the ages, an enormous amount of experience must have been gained of rapid appraisals of large irrigation projects. No doubt in ancient Egypt, and in the irrigation civilisations of the Tigris, Euphrates, Indus, and Yangtze-Kiang basins, innumerable such appraisals were carried out. To my knowledge, however, it is only recently that the experience and methodology of such appraisals have been examined and recorded. Three examples are worth examining.



The first is the diagnostic methodology evolved by the Water Management Synthesis Project originating with Colorado State University/WAPDA action research in Pakistan, especially on the Mena Project (Lowdermilk *et al* 1978) and developed through further work in Egypt, India and elsewhere. This entails detailed professional fieldwork and analysis of what is described as the 'farm irrigation system' or the 'on-farm system'. This is conducted by a multi-disciplinary team usually including an agricultural engineer, an agronomist, an agricultural economist, and a sociologist or extensionist. One strength of the method is its field realism and its 'bottom-up' nature, starting with the farm and the farmer, which makes it an excellent professional experience. Its major defect is that it is not a 'whole system' approach and in particular neglects the main system and its management. When used as a training method, the product is 'an important evaluation of the major constraints to increased agricultural productivity caused by poor on-farm water management practices' (my underlining) (WMSP n.d.: v). The analysis and prescription are confined largely to the subsystem below the outlet with rather little attention to the larger irrigation system. While this severely limits its utility as a diagnostic method for an irrigation system as a whole, and may lead to misleading and suboptimal prescription, it remains a useful training device and component in any more comprehensive diagnosis.

The second example is the rapid appraisals of 24 existing large irrigation projects in India carried out by teams organised by the Central Water Commission between 1975 and 1980 (CWC c. 1980 and personal communications, M.N. Venkatesan). The intention was that each team should include an irrigation engineer, an agronomist, an administrator, an economist, and a social scientist (sociologist). There were difficulties finding economists and sociologists with suitable backgrounds and orientation, and in practice the team usually consisted of an engineer, an agronomist and an administrator. Most of the field appraisals took 3 or 4 days, and project staff accompanied the teams on their visits. An impressive number of deficiencies were diagnosed. Recommendations were presented under three headings, corresponding with the specialisations of the team members - engineering, agronomic, and administrative and legislative. Follow-up with a questionnaire sent to the projects every three months was undertaken, but the results were generally disappointing. One of the main benefits was the comparative view presented by the appraisals as a whole of the nature and prevalence of different types of problems.

The third example is the appraisals of large irrigation projects in four countries carried out by Anthony Bottrall. The results are presented in a World Bank Staff Working Paper (1981) and his methodology and experiences in a subsequent paper (1983). His



focus was the organisation and management of large irrigation schemes, and his purpose to develop a generally applicable analytical framework which could subsequently be used to evaluate the management of large-scale irrigation over a wide range of conditions. Each case study was carried out by Bottrall (himself an agricultural economist), an engineering consultant, and a local researcher. In retrospect, Bottrall considered (1983: 112) that an additional person would have been useful for more detailed research at the watercourse and farm levels to balance the tendency for a management study to take a top-down view. Two to three weeks were usually spent in each study area, plus one to two weeks' general orientation including discussion with planners and administrators at the national level and brief visits to other schemes for comparison. Bottrall (1983) makes many useful observations, which will not be repeated here, but which appraisers, of whatever discipline, will find of practical value.

On the basis of these and other experiences, some observations can be made about the dangers, techniques and strengths of rapid appraisals for existing canal irrigation systems.

#### Dangers of rapid appraisal

If rapid appraisals are to be worthwhile, several traps have to be avoided. It is all too easy to be rapid and wrong. Some of the main dangers are:

- neglecting existing information
- coming with preconceived solutions
- the biases of rural development tourism<sup>1</sup>, with tendencies to visit, meet, see and be concerned with
  - headworks not distribution system
  - headreach not tailend
  - canal roadsides on higher ground, not less accessible lower fields
  - distribution system not drains (or their lack)
  - water entering the system, not wasted water leaving it
  - visible physical things not people
  - senior staff not junior
  - staff not farmers

---

1. I have tried to describe some of these biases more fully elsewhere. Please see Chambers 1980a, and 1983, pp. 13-26 (almost the same as 1980a) for rural development tourism, and 1983: 171-179 for biases in professional values and preferences.

- large farmers not small
  - farmers not labourers
  - men not women
  - dry season not wet season
  - daytime not night
- premature exclusion of choices because of time pressure. Options may take time to be identified, developed and assessed. Premature closure is a major danger.
  - gaps. These are of two types: more obvious gaps left by disciplines which are not represented among the appraisers and less obvious gaps which lie between the disciplines themselves and their traditional territories and concerns. These less obvious gaps include the management of irrigation staff, the management of water supplies in distributaries and minors and through outlets, systems of monitoring and communication, and relations 'across the outlet' between farmers' groups and irrigation management staff.
  - failing to learn from farmers. In straight practical terms farmers' involvement, knowledge and experience are a major resource. To plan changes to water delivery and farming systems without extended learning from farmers would be, to say the least, to take heroic risks on their behalf.

### Team Composition

As already noted, one reflex, once a 'whole system' approach has been agreed, is to try to include all the relevant disciplines. One might think of:

irrigation engineering

hydrology

soil science

agricultural engineering

agronomy

agricultural economics

sociology

administration

law

economics

management science

systems analysis

and so on, without even going into further specialisations such as drainage engineering, or agro-climatology. H.L. Mencken once wrote that 'For every problem there is a solution that is simple, direct, and wrong'. The simple and direct solution of adding disciplines to disciplines runs into diminishing returns and is wrong. The more people in a team, the more time is taken in communication, and/or the less communication takes place. One consequence can be a series of largely unconnected reports or studies without priorities. The more people in a team, too, the more complicated the logistical arrangements. In the field, as Rhoades has shown (1982, photograph on p.16), the more outsiders there are, the more likely they are to talk to one another and not listen to and learn from farmers. The more in the team, too, the longer it takes to produce a report and recommendations. It may also be that the larger a team, the more conservative and cautious team members will be, and the less likely they are to be right in new ways.

The opposite approach is to say that the best multi-disciplinary coordination takes place in the same brain, and that one well-informed, intelligent and perceptive person can do it all. There is a case for training 'irrigation professionals' with some familiarity and competence in all aspects of irrigation systems. But few if any of such people could effectively cover all specialised fields in an appraisal.

Both extremes are to be avoided. The optimal number for a rapid appraisal may be in the range 2 to 7 outsiders, that is, people who are not project staff. Perhaps quite often it will be best if project staff and outsiders together cover these groups of fields: irrigation engineering and hydrology; agricultural engineering and soils; agronomy, agricultural economics and farming systems; sociology and political economy; and management science, administration and law. Interdisciplinary individuals are to be preferred, and people who are flexible with their own discipline and perceptive outside it. Subjects can be combined or split. For any one project, some will be more relevant than others.

In practice, team composition depends on who is available. It is probably quite rare for a desired range of disciplines to be represented. There are some signs of dominant traditions of practices in different countries: in India, appraisal teams, like those of the CWC, of engineers and agronomists, sometimes with an administrator; in the Philippines, of persons with an orientation to farmer participation and organisation. One advantage of rapid appraisals is that because the period involved is short, it is relatively easy to secure the release of the people required and offset the biases towards certain disciplines.

### Logic and Sequence of Enquiry

There are many possible starting points, and the processes of discovery and evolution of ideas are necessarily iterative and untidy. Still, some structure, used sparingly, can help.

One basic tool is the checklist. For rapid appraisals of communal irrigation systems in the Philippines, de los Reyes (1980) has the following headings for information to be collected: system identification; water supply; water rights; physical aspects; history and assistance received; ownership of lands; organisation - non-association managed; organisation - association-managed; opinions on assistance needed; water distribution; conflict; fees; maintenance; and community data. For rapid appraisal of community irrigation systems in Nepal, Yoder and Martin (1983) have prepared a 'Question Guide for the Assessment of Local Resources for Irrigation Development'. This is divided into four sections - general information (location, physical, population, ethnic groups, land holdings, tenancy, agricultural production, employment and migration, markets and prices, institutions, and development projects); organization (membership, social composition, official positions or roles, meetings, water allocation principle, water distribution, conflicts, maintenance, conflict resolution, and organizational development); historical development of existing irrigation system; and technical information (water source, intake, distribution system, soil types, provision for non-crop-related water uses, physical constraints to increasing the irrigated area, and identification of local priorities and resources). Under these headings, Yoder and Martin present lists of pertinent questions. For larger canal projects, Bottrall (1981: 248-263) has compiled a comprehensive and useful listing of potentially relevant factors, organised in three sections - the resource base; indicators of project performance; and identification of causes. He intended

this not as an agenda to be diligently worked through, but as an aid to memory and a reminder of what might be missed. Not everything needs to be known. The key to rapid appraisal is to move quickly and surely to the main problems, opportunities and actions.

For this, each profession and discipline may have its own mental starting points and algorithm.

More generally, the most obvious approach is to follow a top-down resource and input-based logic of water and the physical distribution system. This starts with the irrigation water source (how much, how variable, when available) and follows it through the system (distributed with what losses, in what quantities, when, where, and with what variability and reliability), into the root zone, the plant, the farming systems, and through yield into the household economy and elsewhere. The next stage is then to examine the alternative methods of storage, distribution and farming system.

This can be counterbalanced by a bottom up, output-based, approach, starting with yield (whether good or bad) and working back up the physical system to identify determinants of yield performance at different levels (field, watercourse, outlet, minor, distributary etc.)<sup>1</sup>.

Basic questioning should also help, asking what combinations of water, land, crops and timing can be used to achieve project objectives. These dimensions include size of area to be irrigated, farm size and water entitlements, water scheduling and delivery, location and intensity of irrigation, choice of crops and varieties and their zoning and phasing, the staggering of cultivation, and variations in spatial and temporal cultivation rights (Chambers 1982).

Practical political economy presents another approach. This can start by asking if there are ways in which water can be redistributed so that all will gain<sup>2</sup>. This requires an analytical technique,

---

1. Personal communication, David Seckler.

2. This is not as improbable as it may seem at first sight. See Chambers 1982.

not yet been invented, for finding feasible ways in which topenders can be better off with less water. This technique will require skills in analysing farming systems. Redistribution of water should be much more straightforward and feasible if all gain than some individuals or groups, such as farmers in the head reaches, have to lose. If some groups do have to lose, 'political engineering' may be needed. This can mean representing the interests of those currently at a disadvantage, often tailenders, so that they can assure their rights and help to induce those who have to lose to accept their loss.

Analysis and questions can, indeed, start from the standpoint of any of the disciplines or points of entry. If they conflict, solutions to the conflicts can be sought; if they do not conflict, and green lights of feasibility flash for all disciplines, actors, and modes of analysis, the solution is likely to be practicable.

### Sources of Information and Insight

It is surprisingly easy to overlook sources of information and insight. The following is a short indicative but not comprehensive list:

#### Key People

1. Irrigators (tail, middle, head) and other local residents
2. Irrigation staff
3. Staff of other government departments
4. Staff of non-government organisations working in the area
5. Specialists called in on an ad hoc basis

#### Maps, Photographs etc.

1. Maps of the system and subsystems, including irrigation network, soils, topography, cropping patterns, as available
2. Aerial photographs, with time series if available
3. Remote sensing and Landsat imagery (see e.g. Heller and Johnson 1979)
4. Aerial inspection (Abel and Stocking 1979) or a view from a hill



Documents

1. Project appraisal and design documents
2. Reports of previous teams, surveys, evaluations and special studies
3. Annual and other routine reports of departments
4. Historical documents referring to water rights and customs
5. Data from agricultural and/or soil and water management research stations, including up-to-date information about crop varieties available or about to be released
6. Charts and tables with time series data on rainfall, water storage, flows, distribution, groundwater levels, etc.
7. Manuals and circulars concerning water distribution routines and practices
8. Descriptions and files concerning crises of water shortage or flooding and how they were tackled

It is not always easy to obtain or tap such sources quickly. How to do so cost-effectively, given a short period, leads to the next questions.

Activities and Sequence

A rapid appraisal is only one of a series of preceding and subsequent activities. The way it is set up will depend on what has gone before and what will follow. There is a danger that it will be seen as a high-powered group of outsiders (senior government staff, researchers etc.) who descend on a project, tell everyone what to do, and then leave. If the objective is to identify and initiate or reinforce a sequence of change (whether through fact-finding research, action research, or direct interventions) the staff managing and working on the project must be full participants throughout, contributing their experience and ideas and influencing the proposals which emerge.

The outline which follows indicates one possible sequence for a rapid appraisal:

(i) Selection

If a series of appraisals is planned, the selection of projects is important. One criterion is the potential believed to exist for improved irrigation performance.

(ii) Preparation

Before the appraisal proper, a preliminary visit by one or two outsiders (i.e. people who are not directly engaged in managing the irrigation system or working on it) may be very useful. Ideally they will be members of the subsequent appraisal team. They would:

- meet project staff to discuss the appraisal
- request project staff to complete questionnaires<sup>1</sup>
- find a place to work (big room, blackboards, accessible at night)
- arrange vehicles, part-time small aeroplane etc.
- identify (a few) local participants (from government departments, perhaps a voluntary agency, etc.)
- request maps, reports etc. to be centralised

(iii) The Rapid Appraisal

Two weeks may be about right. The usual rapid appraisal seems to take 2-4 days. This is too short for adequate discussions with farmers, for identifying, trying out, discussing, modifying and rejecting ideas, and for assessing mixes, sequences and the locations for them.

---

1. For this idea I am indebted to the team (Wayne Clyma, T.K. Jayaraman; Max Lowdermilk and Barry Nelson) which in 1981 conducted a five-week course of professional development for engineers, economists, agricultural scientists and others at Anand. The questionnaires they issued to Irrigation Department staff on the Mahi-Kadana Project provoked some thoughtful, detailed and very useful replies, and encouraged constructive suggestions based on experience. Had this been a rapid appraisal exercise, these questionnaires would have given the team a head start.

It is also too short for a period of reviewing information already available, and what needs to be found out and how. One method (personal communication, Mark Svendsen) is for a team to fill in a matrix comprised of the questions

what information is needed

who will obtain it

where will it be obtained

how should it be obtained

This helps team members to know each others' concerns and priorities, and leads to realistic planning of logistics and the use of time. Involving project staff in this exercise will enable them to participate and contribute. In a rapid appraisal, a day on such an exercise may prove to be a day well spent providing it does not box the team into a plan with little room for subsequent manoeuvre.

The activities of two weeks could follow many patterns. One possibility is:

#### A. First Week

1. Briefings, discussions with project staff, and drawing up an information matrix as above.
2. First field familiarisation (in pairs or small groups)
3. Comparison of impressions, assessment of priorities.
4. Flights over the area
5. Main field visits. One approach is Peter Hildebrand's (1981) technique, evolved in Guatemala, of joint visits of pairs from different disciplines, changing pairs day by day. This could be adapted with outsider appraisers pairing with project staff, or farmers, and so on. Many variants are possible. In the field the guided interview technique (Collinson 1981; Ellman 1981) could be used together with informal interviews (Rhoades 1982) for rapid understanding of the farming system and its relation to irrigation. Some visits would also be along disciplinary lines, with straight disciplinary concerns.

6. Evening discussions. These could alternate between team discussions, sharing what had been found out, and identifying new priorities, and (if the time is convenient for them) group discussions with farmers. (This latter deserves emphasis because it is liable to be last on the list of activities, and so to fall by the wayside). A good deal of open-ended brainstorming is indicated, avoiding premature closure on solutions.

At the end of this first week, the aim would be for team members to have a sound appreciation of the farming and irrigation systems and their seasonal operation, and some strong indication of problems and opportunities. This would lead to

7. The compilation of a tentative plan with main alternatives, and listing of further information to be obtained, hypotheses to be tested, and so on.

#### B. Second Week

The second week would then be taken up with testing, rejecting and modifying proposals. The tendency of busy people will be to consider the second week dispensable. This should be resisted. The second week is precisely when the less obvious snags and opportunities are likely to come to light. In particular, during the second week, better information may come from junior staff and from farmers. A second week is also important for assessing the feasibility of alternative water distribution and cropping systems, and of exploring the economic implications for households.

#### (iv) Follow-up

Rapid appraisal is a gratifying, self-flattering and often rather enjoyable activity, with short-term responsibilities. It is far, far easier to give 'good' advice than to take it. 'Good' rapid appraisal will be bad rapid appraisal unless it leads to better performance.

This raises questions concerning government programmes, staffing, finance, timing and priorities. Appraisal teams may be tempted to advocate ideal solutions which require major interventions - rehabilitation of works, widening of canals, and the like - which will take a long time, to the neglect of what can be done without delay. Three precepts can be recommended for the appraisal itself in order to increase chances of implementation in the follow-up:

- a. full involvement of project staff. Project staff should take part so fully that the proposals are, and are felt to be, theirs, not just those of the visiting outsiders.
- b. meshing with current programmes. Proposals should, where possible, fit existing programmes and fund allocations.
- c. priority to what can be done soon. This may quite often indicate monitoring and communication, water scheduling, farmers' participation, and limited action research.

The sequenced proposals from the appraisal would usually comprise some immediate action, initiating processes of change, and some longer-term proposals. They might often include some pilot or experimental elements. They would set directions and priorities but they would not be a rigid blueprint. There would be allowance for learning and adjustments in the course of implementation.

### Improving Rapid Appraisals

The success or otherwise of rapid appraisals depends on many factors, including the open-mindedness and experience of those who take part. Rapid appraisals will not succeed well if participants take too narrow a view of their responsibilities. If rapid appraisals are treated as learning experiences by all those concerned, including learning from colleagues in other professions, the chances of good outcomes will be greater. Specialisation is needed, but so is breadth of understanding, and seeing the linkages and gaps between the concerns of the disciplines. Appraisals will improve as appraisers improve, broadening their concerns and deepening their experience.

Open-mindedness and a learning attitude should also help improve appraisal techniques. The methods of rapid appraisal are themselves a subject for appraisal, research and development. Inventiveness and improvisation are called for. Techniques need to be assessed and recorded. Sometimes the activities of appraisal seem so obvious that they do not appear worth writing down. But what is obvious to one person may be novel to another. The methods of rapid appraisals deserve to be treated seriously as a subject in their own right, written about, criticised, and compared, so that their cost-effectiveness can improve and good techniques be learnt and used more widely. The final hope of this paper is to provoke and encourage others who conduct rapid appraisals to share their experiences and techniques.



## REFERENCES

- Abel, Nick and Michael Stocking 1979 "Rapid aerial survey techniques for rural areas", paper to Conference on Rapid Rural Appraisal, Institute of Development Studies, University of Sussex, 4-7 December
- Agricultural Administration 1981 Special Issue on Rapid Rural Appraisal, 8,6, November
- Ali, Syed Hashim 1980 'Water Management of Command Areas in Andhra Pradesh, India', Report of the Expert Consultation on Farm Water Management, Beltsville, USA, 13-15 May
- Ali, Syed Hashim and Syed Turabul Hassan 1980 'Management of Canal Irrigation Systems and Warabandi', in K.K. Singh, ed., Warabandi for Irrigated Agriculture in India, pp. 32-37.
- Ali, Syed Hashim 1983 'Water Scarcity and the Role of Operation and Maintenance: Administration and Farmers' Organisations', in K.K. Singh, ed., Utilization of Canal Waters, pp. 40-47, (citing Mr. G.K. Misra, Additional Chief Engineer, Lucknow, March 1981)
- ASCE 1980 Operation and Maintenance of Irrigation and Drainage Systems, prepared by the Committee on Operation and Maintenance of Irrigation and Drainage Systems of the Irrigation and Drainage Division of the American Society of Civil Engineers
- Bhuiyan, Sadiqul I. 1980 "Water Allocation, Distribution, and Use Criteria for Irrigation System Design and Management: Selected Research Findings", in IRRI 1980. Irrigation Water Management, pp. 139-157
- Bottrall, Anthony 1981 Comparative Study of the Management and Organization of Irrigation Projects, World Bank Staff Working Paper No. 458, World Bank, 1818 H Street, N.W., Washington D.C. 20433, May.
- Bottrall, Anthony 1983 'An Approach to Evaluating the Organisation and Management of Large Irrigation Schemes', in K.K. Singh, ed., Utilization of Canal Waters, pp. 102-113.
- Carruthers, Ian 1979 "Too Late to Change: the Reality of multi-disciplinary Planning in Irrigation", paper for the Conference on Rapid Rural Appraisal held at the Institute of Development Studies, University of Sussex, Brighton, UK, 4-7 December.

- Carruthers, Ian and Robert Chambers 1981 'Rapid Appraisal for Rural Development', Agricultural Administration, 8, 6, pp. 407-422.
- CGIAR 1982 Report of the TAC Study Team on Water Management Research and Training, TAC Secretariat, Consultative Group for International Agricultural Research, FAO, Rome, April.
- Chadha, C.P. 1980 "Consultancy Services in Water Resources Development", Irrigation and Power Journal, 37, 4, October, pp. 387-389.
- Chambers, Robert 1980a "Rural Poverty Unperceived: Problems and Remedies", World Bank Staff Working Paper 400, July
- Chambers, Robert 1980b "In search of a water revolution: questions for managing canal irrigation in the 1980s", in IRRI, Irrigation Water Management, pp. 23-37.
- Chambers, Robert 1980c "Rapid Rural Appraisal: Rationale and Repertoire", IDS Discussion Paper 155, Institute of Development Studies, University of Sussex, Brighton, UK, September.
- Chambers, Robert 1982 'Irrigation Management: Ends, Means and Opportunities', paper for the Workshop on Productivity and Equity in Irrigation Systems in India, Gird Institute of Development Studies, Lucknow, 21-23 September
- Chambers, Robert 1983 Rural Development: Putting the Last First, Longmans, Harlow, UK.
- Chambers, Robert (forthcoming) 'Shortcut Methods in Social Information - Gathering for Rural Development Projects', in Michael Cernea, ed., Putting People First: Sociology and Development Projects, World Bank, 1818 Street, N.W., Washington, D.C. 20433
- Collinson, Michael 1981 "A low cost approach to understanding small farmers", Agricultural Administration, 8, 6, pp. 433-450.
- CWC c. 1980 Recommendations of Central Team on Water Utilization on 24 Existing Projects, Central Water Commission, New Delhi.
- De los Reyes, Romana P. 1980 "Guidelines for Data Collection for Communal Profiles", mimeo, Institute of Philippines Culture (available from I.D. Khurana, The Ford Foundation, 55 Lodi Estate, New Delhi 110003)

- Early, Alan C. 1980 "An Approach to Solving Irrigation System Management Problems", in IRRI, Irrigation Water Management, pp. 83-113.
- Ellman, Anthony 1981 "Rapid appraisal for rural project preparation", Agricultural Administration, 8,6, pp. 463-471
- GOAP 1980 Government Order Ms. No. 58 (Integrated Water Management), Command Area Development (II) Department, Government of Andhra Pradesh, 5-8-1980
- GOK 1980 Proposed Project on Better Irrigation Water Management through Rotational Water Supply, Irrigation Department, Government of Karnataka, Bangalore, May
- Hassan, Syed Turabul 1981 "Evaluation Study of Warabandi (Rotational Water Supply System) under Shreeramasagar Project, Command Area Jagtial, Andhra Pradesh (since 1978)," Command Area Development Department, Jagtial, A.P., January.
- Heller, Robert C. and Kim A. Johnson 1979 "Estimating Irrigated Land Acreage from Landsat Imagery", Photogrammetric Engineering and Remote Sensing, Vol. 45, No. 10, October, pp. 1379-1386.
- Hildebrand, Peter E. 1981 "Combining disciplines in rapid appraisal: the Sondeo approach", Agricultural Administration, 8,6, pp. 423-432.
- Honadle, George 1982 'Rapid Reconnaissance for Development Administration: Mapping and Moulding Organizational Landscapes', World Development, 10,8, pp. 633-649
- IRRI 1980 Report of a Planning Workshop on Irrigation Water Management, The International Rice Research Institute, F.O. Box 933, Manila.
- IWRS 1982 Workshop on Water Distribution Practices, July 2-3, 1982 Proceedings, Indian Water Resources Society, organised by Water Resources Development Training Centre, University of Roorkee, Roorkee 247672
- Kathpalia, G.N. 1980 "Rotational System of Canal Irrigation and Warabandi", in K.K. Singh, ed., Warabandi for Irrigated Agriculture in India, pp. 38-45.

- Lenton, Roberto 1980 "Field Experimentation and Generalisation in Irrigation Development and Management", paper presented at the 17th Annual Convention of the Indian Society of Agricultural Engineers, at the Indian Agricultural Research Institute, New Delhi, 6-8 February
- Lenton, Roberto 1982 'Management Tools for Improving Irrigation Performance', paper presented at a special course on "Water Management in Irrigation Systems", Central Water Commission, New Delhi, January
- Levine, G. and T. Wickham 1977 "Some Critical Issues in Irrigation Planning for Southeast Asia", paper presented at the seminar on "Water Resources Problems in Developing Countries", University of Minnesota, July (reproduced by the Irrigation and Water Management Department, IRRI, Box 933, Manila)
- Longhurst, Richard ed. 1981 Rapid Rural Appraisal: Social Structure and Rural Economy, IDS Bulletin 12, 4
- Lowdermilk, M., A. Early and D. Freeman 1978 Farm Irrigation Constraints and Farmers' Responses: Comprehensive Field Survey in Pakistan, Water Management Technical Report No. 48 (6 vols.), Colorado State University.
- Malhotra, S.P. 1982 The Warabandi System and Its Infrastructure, Central Board of Irrigation and Power, Publication No. 157, Malcha Marg, New Delhi, April
- Mishra, Anupam 1981 An Irrigation Project that has Reduced Farm Production, Centre for Science and Environment, 805 Vishal Bhawan, 95 Nehru Place, New Delhi 110019
- Pacey, Arnold 1981 Taking Soundings in Developing Communities: An Approach to the Information Needs of Rural Development Workers, District Officials, and Health Service Staff, WHO, Geneva
- Padhi, G.N. and A.R. Suryavanshi 1982 'Evaluation of Water Distribution Method of Left Salawa Distributary of Upper Ganga Canal System', in IWRS 1982 Workshop on Water Distribution Practices, pp. 23-34.
- Pant, Niranjana 1981 Some Aspects of Irrigation Administration (A Case Study of Kosi Project), Naya Prokash, Calcutta 700006

- Patel, C.C. 1980 "Warabandi: Problems, Needs and Suggestions", in K.K. Singh, ed. Warabandi for Irrigation Agriculture in India, pp. 7-10.
- Patel, C.C. 1983 "India's Irrigation Systems: Approaches to Improvement", in K.K. Singh, ed. Utilization of Canal Waters, pp. 9-10
- Reuss, John O. 1980 'Field Research on Farm Water Management in Pakistan', in TNAU, Field Research Methodologies, pp. 105-120.
- Rhoades, Robert E. 1982 The Art of the Informal Agricultural Survey, International Potato Center, Aptdo 5969, Lima, Peru, March
- Seckler, David 1981 "The New Era of Irrigation Management in India, Ford Foundation, 55 Lodi Estate, New Delhi 110003
- Singh, K.K. ed., 1980a Warabandi for Irrigated Agriculture in India, Publication No. 146, Central Board of Irrigation and Power, Malcha Marg, New Delhi 110021, November
- Singh, K.K. 1980b "Warabandi in Canal Commands: Concept and Practice", in K.K. Singh ed. Warabandi for Irrigated Agriculture in India, pp. 11-22
- Singh, K.K. ed. 1983 Utilization of Canal Waters: a Multi-Disciplinary Perspective on Irrigation, Publication No. 164, Central Board of Irrigation and Power, Malcha Marg, New Delhi 110021, April
- Stocking, Michael and Nick Abel 1981 "Ecological and environmental indicators for the rapid appraisal of natural resources", Agricultural Administration, 8, 6, pp. 473-484
- Swaminathan, M.S. 1981 Irrigation and Our Agricultural Future, First Ajudhia Nath Khosla Lecture, University of Roorkee, Roorkee 247672
- Swift, Jeremy 1981 "Rapid appraisal and cost-effective participatory research in dry pastoral areas of West Africa", Agricultural Administration, 8, 6, pp. 485-492
- TNAU 1981 Field Research Methodologies for Improved Irrigation Systems Management, Proceedings of the International Seminar, September 15-18, 1981, College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore 641003, India



- Valera, A. and T. Wickham 1976 "Management of Traditional and Improved Irrigation Systems: Some Findings from the Philippines", paper presented to the Workshop on Choice in Irrigation Management, held at Canterbury, organised by the Overseas Development Institute, London, September
- Wade, Robert and Robert Chambers 1980 "Managing the Main System: Canal Irrigation's Blind Spot", Economic and Political Weekly, 35, 39 (Review of Agriculture), September, pp. A.107-A.112.
- WAPCOS 1980 "M.P. Composite Project Outlet Studies - Summary Report", Water and Power Consultancy Services (India) Ltd., New Delhi, 18.2.1980
- Wickramasinghe, Lakshman and E.J. van der Velde 1980 'Action Research into Farmer Participation in Irrigation System Management: a Sri Lankan Experiment', in TNAU Field Research Methodologies, pp. 21-40
- WMSP n.d. but c. 1982 Monitoring and Evaluation Manual: Diagnostic Analysis of Farm Irrigation Systems, Volume 1, Water Management Synthesis Project (Colorado State University)
- Yoder, Robert and Edward Martin 1983 Identification and Utilization of Farmer Resources in Irrigation Development: a Guide for Rapid Appraisal, Nepal Irrigation Research Project, Cornell University for Rural Area Development - Rapti Zone Project, April (available from I.D. Khurana, The Ford Foundation, 55 Lodi Estate, New Delhi 110 003).

## Appendix

### Priorities for Measures for Improving Canal Irrigation

You may wish to make these entries for canal irrigation generally, or for a particular project with which you are familiar:

	The likely best measure to start with	The likely best sequence	The measures from which most benefits will eventually come
action research			
administrative practice and law			
administrative structure			
biological problems and potentials			
farmers' organisation			
farming systems			
main system water distribution			
main system works and maintenance			
management science and monitoring			
physical problems and potentials			
resource opportunities			
works at and below the outlet			

Priorities for Measures for Improving Canal Irrigation

You may wish to make these entries for canal irrigation generally, or for a particular project with which you are familiar:

	The likely best measure to start with	The likely best sequence	The measures from which most benefits will eventually come
action research			
administrative practice and law			
administrative structure			
biological problems and potentials			
farmers' organisation			
farming systems			
main system water distribution			
main system works and maintenance			
management science and monitoring			
physical problems and potentials			
resource opportunities			
works at and below the outlet			

## IN THIS SERIES

- |                          |  |
|--------------------------|--|
| D. P. No. 1<br>May 1983  | "Hunger and Malnutrition : Challenges for the 1980's,"<br>by Dr. Lincoln Chen.   |
| D. P. No. 2<br>May 1983  | "Credit for Self-Employment of Women,"<br>by Pushpa Sundar   |
| D. P. No. 3<br>June 1983 | "Social Forestry, Wood Gasifiers and Lift Irrigation :<br>Synergistic Relations Between Technology and Natural<br>Resources in Rural India", by Deep Joshi, David Seckler<br>B. C. Jain. |
| D.P. No. 4<br>June 1983  | Development of Archaeology in India and Sri Lanka<br>by B.K. Thapar  |
| D.P. No. 5<br>June 1983  | Management Tools for Improving Irrigation Performance<br>by Roberto L. Lenton  |
| D.P. No. 6<br>June 1983  | Women's Roles in Large Employment Systems<br>by Devaki Jain, Viji Srinivasan   |
| D.P. No. 7<br>July 1983  | Gaming Simulations of Irrigation Systems : Prospects for Manage-<br>ment Training<br>by Dr. Graham P. Chapman  |
| D.P. No. 8<br>Aug. 1983  | Rapid Appraisal for Improving Existing Canal Irrigation System<br>by Robert Chambers   |
| D.P. No. 9<br>Aug. 1983  | Beyond the Green Revolution<br>by Robert Chambers  |